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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,453	09/05/2003	Yuan Wu	03-SIN-092	8429

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STMICROELECTRONICS, INC.  
MAIL STATION 2346  
750 CANYON DRIVE, SUITE 300  
COPPELL, TX 75019

EXAMINER
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PAUL, DISLER

ART UNIT	PAPER NUMBER
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2614

NOTIFICATION DATE	DELIVERY MODE
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03/07/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

angie.rodriguez@st.com  
ip.us@st.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/656,453	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> DISLER PAUL	<b>Art Unit</b> 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1/17/11.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-6; 13-17; 33-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 33; 38; 40-43 is/are rejected.
- 7) ☒ Claim(s) 4-6; 13-17; 34-37; 39 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/7/11 has been entered.

### ***Allowable Subject Matter***

Claims 34; (35, 4-6); 36-37; (39,13-17) are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

RE claim 34, none of the prior arts of record disclose the virtualizer comprises : a filter configured to filter input signals comprising the audio information; a first combiner configured to produce first output signals for a first physical speaker using the output of the filter and a second combiner configured to produce second output signals for a second physical speaker using an output of the forward crossover path and the output of the first feedback crossover path; and a second feedback crossover path configured to receive, delay, and filter the second output signals, the first combiner further

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configured to produce the first output signals using an output of the second feedback crossover path.

Similarly, claim 35 has been analyzed and objected for similar reason as in claim 34.

Re claim 39, none of the prior arts of record disclose wherein one or more first combiners operable to produce first output signals for a first physical speaker using one or more of: one or more of the input signals, one or more outputs from the filters, and one or more outputs from the forward crossover paths and one or more second combiners operable to produce second output signals for a second physical speaker using one or more of: one or more of the input signals, one or more outputs from the filters, and one or more outputs from the forward crossover paths; a first feedback crossover path operable to receive, delay, and filter the first output signals, the one or more second combiners further operable to produce the second output signals using an output from the first feedback crossover path.

### ***Response to Argument***

The applicant's had argued the following key element:

A- a person of ordinary skill in the art having common sense at the time of the invention would not have reasonably looked to Tanner to solve a problem already solved by Kumamoto; (the feedback path being configured to delay and filter output signal).

Therefore, we agree with Appellants that the Examiner has impermissibly used the instant claims as a guide or roadmap in formulating the rejection.

B-in addition of the delay and inversion, as taught by Tanner, **would change the principle of operation of Kumamoto**. Delaying and inverting the generated crosstalk cancellation signal would cause the generated crosstalk cancellation signal to not cancel the crosstalk. The proposed modification cannot change the principle of operation of a reference.

Such argument has been further considered and is non-persuasive over new ground of rejection with prior art Kumamoto (US 6285766 B1).

The prior art as in Kumamoto explicitly disclose of a system wherein a virtualizer comprising: a first feedback crossover path configured to receive, **delay**, and filter signals output from the virtualizer; and a forward crossover path configured to receive, **delay** and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are, combined to produce at least one output signal from the virtualizer (fig.1 (b) (103a; 103b, 106,108); fig.3; fig.6; fig.5 (fig.13 (1303); fig.15-16 (1503; 1603); fig.11 (1115; 1103); col.8 line 52-67 & col.9 line 1-49 ; col.12 line 1-20; col.14 line 15-30; col.15 line 45-54; col.13 line 1-5; col. 19 line 5-15/herein the virtualizer comprise an output of a forward crossover path filter and

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output of a feed back path filter with a delay component; which are then combined, and thus, based on the different crossover path of the signal to be filter, there is the intrinsic delay effect during such crossover path processing) so as to produce virtual sound images in which multiple cancellation, in which the generation of crosstalk canceling signal and the crosstalk cancellation using the generated signal are repeated become possible and thereby removing crosstalk component on the input signal.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota (US 7424121 B2) and Kumamoto (US 6,285,766 B1).

Re claim 33, Kubota discloses of an audio processor, comprising: a virtualizer configured to process audio information to virtualize at least one speaker such that, from a listener's perspective, sounds appear to come from at least one direction where a physical speaker is not present (fig.5 (2); fig.6; col.1 line 30-50; col.3 line 10-20; col.4 line 10-15) and a controller configured to cause the virtualizer to virtualize the at least one speaker at any location in a space around the listener (fig.5 (1); col.1 line 14-20; col.3 line 60-67; col.4 line 15-20).

However, Kubota never specifies of the virtualizer comprising a first feedback crossover path configured to receive, delay and filter signals output from the virtualizer; and a forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are, combined to produce at least one output signal from the virtualizer.

But, Kumamoto disclose of a system wherein a virtualizer comprising: a first feedback crossover path configured to receive, delay and filter signals output from the virtualizer; and a forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are, combined to produce at least one output signal from the virtualizer (fig.1 (b) (103a; 103b, 106,108); fig.3; fig.6; fig.5 (fig.13 (1303); fig.15-16 (1503; 1603); fig.11 (1115; 1103); col.8 line 52-67 & col.9 line 1-49 ; col.12 line 1-20; col.14 line 15-30; col.15 line 45-54; col.13 line 1-5; col. 19 line 5-15/herein the virtualizer comprise an output of a forward crossover path filter and output of a feed back path filter with a delay component; which are then combined, and thus, based on the different crossover path of the signal to be filter, there is the intrinsic delay effect during such crossover path processing) so as to produce virtual sound images in which multiple cancellation, in which the generation of crosstalk canceling signal and the crosstalk cancellation using the generated signal are repeated become possible.

Thus, it would have been obvious for one of the ordinary skills in the art to have modified the prior art by adding the comprising: a first feedback crossover path configured to receive, delay and filter signals output from the virtualizer; and a forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are, combined to produce at least one output signal from the virtualizer so as to produce virtual sound images in which multiple cancellation, in which the generation of crosstalk canceling signal and the crosstalk cancellation using the generated signal are repeated become possible.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota (US 7424121 B2) and Neidich et al. (US 7,113,609 B1) and Kasai et al. (US 7242782 B1) and Kumamoto (US 6,285,766 B1).

Re claim 38, Kubota discloses of a device, comprising: an audio source operable to provide audio information (fig.4 (3); col.3 line 60-62; col.4 line 1-9); and an audio processor operable to receive the audio information and process the audio information to virtualize at least one speaker so that, from a listener's perspective, sounds appear to come from at least one direction where a physical speaker is not present, the audio processor being configurable to virtualize the at least one speaker at any location in a space around the listener (fig.4 (2); fig.2 (2); col.4 line 10-25); and wherein the audio



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processor comprises: a virtualizer configured to process audio information to virtualize the at least one speaker (fig.2-3 (2); col.5 line 5-11) and a controller configured to cause the virtualizer to virtualize the at least one speaker based on certain position information (fig.1-2 (1); col.2 line 5-15; col.3 line 54-63/the virtualizer to create the phantom image based on the position and movement information parameters of the audio signals).

However, Kubota fail to disclose the controller being configured to determine a location of the at least one speaker based on a number of parameters including at least a position of at least one actual speaker and configured to cause the virtualizer to virtualize the at least one speaker at the determined location.

But, Neidich et al. disclose of a controller being configured to determine a location of the at least one speaker based on a number of parameters including at least a position of at least one actual speaker and configured to cause a virtualizer to virtualize the at least one speaker at the determined location (fig.3 (30,37); fig.4; col.5 line 50-60; col.6 line 4-12; col.8 line 45-67/ a virtualizer to virtualize the rear center speaker based on the determined speaker position) so as to create an improved virtual surround signals based on the relative physical characteristics of the speakers. Thus, it would have been obvious for one of the ordinary skills in the art to have modified the prior arts by adding the controller being configured to determine a location of the at least one speaker based on a number of parameters including at least a position of at least one actual speaker and configured to cause a virtualizer to virtualize the at least one

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speaker at the determined location so as to create an improved virtual surround signals based on the relative physical characteristics of the speakers.

However, the combined teaching of Kubota and Neidich et al. as a whole, fail to disclose of the specific wherein the virtualizer to virtualize the speakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines

But, Kasai discloses of a virtualizer to virtualize the speakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines (fig.19 (120a, 1208) or {201-202,205-206}; col.12 line 37-47/each individual filter being altered and also having a delay line as being adjusted for creating the phantom sound signal) so as to improve the accuracy in the low frequency component of the sound image and obtain the desired /optimum properties for the filter as desired. Thus, it would have been obvious for one of the ordinary skill in the art to have modified the prior art by adding the virtualizing the loudspeakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines for improving the accuracy in the low frequency component of the sound image and obtain the desired /optimum properties for the filter as desired.

The combined teaching of Kubota and Neidich et al. and Kasai as a whole, never specify of the virtualizer comprising at least one feedback crossover path configured to receive, delay and filter signals output from the virtualizer; and at least one forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are combined to produce at least one output signal from the virtualizer.

But, Kumamoto disclose of a system wherein a virtualizer comprising at least one feedback crossover path configured to receive, delay and filter signals output from the virtualizer; and at least one forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are combined to produce at least one output signal from the virtualizer (fig.1 (b) (103a; 103b, 106,108); fig.3; fig.6; fig.5 (fig.13 (1303); fig.15-16 (1503; 1603); fig.11 (1115; 1103); col.8 line 52-67 & col.9 line 1-49 ; col.12 line 1-20; col.14 line 15-30; col.15 line 45-54; col.13 line 1-5; col. 19 line 5-15/herein the virtualizer comprise an output of a forward crossover path filter and output of a feed back path filter with a delay component; which are then combined, and thus, based on the different crossover path of the signal to be filter, there is the intrinsic delay effect during such crossover path processing) so as to produce virtual sound images in which multiple cancellation, in which the generation of crosstalk canceling signal and the crosstalk cancellation using the generated signal are repeated become possible.

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Thus, it would have been obvious for one of the ordinary skills in the art to have modified the prior art by adding virtualizer comprising at least one feedback crossover path configured to receive, and filter signals output from the virtualizer; and at least one forward crossover path configured to receive, delay and filter an output of a first filter, wherein an output of the first feedback path and an output of the forward crossover path are combined to produce at least one output signal from the virtualizer so as to produce virtual sound images in which multiple cancellation, in which the generation of crosstalk canceling signal and the crosstalk cancellation using the generated signal are repeated become possible.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 40-41; 43 are rejected under 35 U.S.C. 102(b) as being anticipated over Kumamoto (US 6,285,766 B1).

Re claim 40, Kumamoto disclose of a method, comprising: receiving a first physical speaker signal (fig.1 (b) (104); col.9 line 3-15); generating first output signals for a first physical speaker and generating second output signals for a second physical speaker and wherein the first and second output signals are generated from the

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received first physical speaker signal (fig.1 (b) (105); col.9 line 30-37; fig.15-16 (1505,1605)).

Kumamoto further discloses of the specific wherein generating the second output signal comprises combining an output of at least one feedback crossover path operable to receive, delay and filter the first output signal and a first forward crossover signal received from a first forward crossover path operable to receive, delay and filter a first input signal ((fig.1 (b) (103a; 103b, 106,108); fig.3; fig.6; fig.5 (fig.13 (1303); fig.15-16 (1503; 1603); fig.11 (1115; 1103); col.8 line 52-67 & col.9 line 1-49 ; col.12 line 1-20; col.14 line 15-30; col.15 line 45-54; col.13 line 1-5; col. 19 line 5-15/herein the virtualizer comprise an output of a forward crossover path filter and output of a feed back path filter with a delay component; which are then combined, and thus, based on the different crossover path of the signal to be filter, there is the intrinsic delay effect during such crossover path processing).

Re claim 41, The method of Claim 40, wherein providing further comprises: providing the second output signals to a first feedback crossover path operable to receive, delay, and filter the second output signals; an providing the first output signals to a second feedback crossover path operable to receive, delay, and filter the first output signals (fig.1 (b) (106a; 106b); col.8 line 60-67).

Re claim 43 ; the method of Claim 40, further comprising: filtering one or more input signals to produce one or more filtered input signals (fig.15 (1507); fig.1b (107); col.8 line 55-60); providing one or more of the filtered input signals to one or more forward crossover paths (fig.5 (215); fig.10 (1015)/the filter signal may be forwarded to a forward path); and generating the first and second output signals using one or more of: one or more of the input signals, one or more of the filtered input signals, and one or more outputs from the forward crossover paths (fig.1b (103); fig.15 (1503); col.8 line 55-60) ; wherein generating the first output signals further comprises using an output from the second feedback crossover path and wherein generating the second output signals further comprises using an output from the first feedback crossover path (fig.1 (b) (103,105); fig.15 (1505,1503)) an wherein the first output signals emulate effects of a virtual speaker on one ear of a listener, the second output signals emulate effects of the virtual speaker on another ear of the listener and each of the output signals at least partially cancels crosstalk caused by the other output signals (col.19 line 25-40; col.20 line 25-31; col.21 line 5-38/the signals to emulate multiple virtual sounds and does cross talk cancellation).

Claims 42; 30-31 are rejected under 35 U.S.C. 103(a) as being Unpatentable over Kumamoto (US 6,285,766 B1) and Kasai et al. (US 7242782 B1).

Re claim 42, the method of Claim 41, wherein the first and second output signals are produced using one or more first filters, one or more forward crossover paths each

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comprising a first delay line and a second filter; and two feedback crossover paths each comprising a second delay line and a third filter (fig.1 (b) (103,107, 108, 106); fig.15-16; col.8 line 53-60).

However, Kumamoto fail to disclose of such specific as individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines to change the location of one or more of the virtualized speakers.

But, Kasai disclose of a such concept of as individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines to change the location of one or more of the virtualized speakers ( fig.19 (120a, 1208) or {201-202,205-206}; col.12 line 37-47/each individual filter being altered and also having a delay line as being adjusted for creating the phantom sound signal) so as to improve the accuracy in the low frequency component of the sound image and obtain the desired /optimum properties for the filter as desired. Thus, it would have been obvious for one of the ordinary skill in the art to have modified the prior arts by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines to change the location of one or more of the virtualized speakers for improving the accuracy in the low frequency component of the sound image and obtain the desired /optimum properties for the filter as desired.

Re claim 30, the method of Claim 42, wherein the first and second output signals emulate the effects of multiple virtual speakers on the ears of the listener (col.19 line 25-40; col.20 line 25-31; col.21 line 5-38/the signals to emulate multiple virtual sounds).

Re claim 31, the method of Claim 42, wherein the first and second output signals emulate the effects of multiple virtual speakers at any locations in a space around the listener (col.19 line 25-40; col.20 line 25-31; col.21 line 5-38/the signals to emulate multiple virtual sounds).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DISLER PAUL whose telephone number is (571)270-1187. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/D. P./

Examiner, Art Unit 2614

/Devona E. Faulk/

Primary Examiner, Art Unit 2614